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EXAMINER

TSAY, F

C5M1/0810

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ART UNIT

PAPER NUMBER

3506

DATE MAILED: 08/10/94

This is a communication from the examiner in charge of your application.  
COMMISSIONER OF PATENTS AND TRADEMARKS

☐ This application has been examined ☒ Responsive to communication filed on 6/10/94 ☒ This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), — days from the date of this letter.  
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

- |   |  |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited by Examiner, PTO-892.        | 2. <input type="checkbox"/> Notice re Patent Drawing, PTO-948.                   |
| 3. <input type="checkbox"/> Notice of Art Cited by Applicant, PTO-1449.             | 4. <input type="checkbox"/> Notice of Informal Patent Application, Form PTO-152. |
| 5. <input type="checkbox"/> Information on How to Effect Drawing Changes, PTO-1474. | 6. <input type="checkbox"/> _____  |

Part II SUMMARY OF ACTION

1. ☒ Claims 1-18 are pending in the application.

Of the above, claims 12-14 are withdrawn from consideration.

2. ☐ Claims \_\_\_\_\_ have been cancelled.

3. ☐ Claims \_\_\_\_\_ are allowed.

4. ☒ Claims 1-11 and 15-18 are rejected.

5. ☐ Claims \_\_\_\_\_ are objected to.

6. ☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

7. ☒ This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.

8. ☐ Formal drawings are required in response to this Office action.

9. ☐ The corrected or substitute drawings have been received on \_\_\_\_\_. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable ☐ not acceptable (see explanation or Notice re Patent Drawing, PTO-948).

10. ☐ The proposed additional or substitute sheet(s) of drawings, filed on \_\_\_\_\_, has (have) been ☐ approved by the examiner ☐ disapproved by the examiner (see explanation).

11. ☐ The proposed drawing correction, filed on \_\_\_\_\_, has been ☐ approved ☐ disapproved (see explanation).

12. ☐ Acknowledgment is made of the claim for priority under U.S.C. 119. The certified copy has ☐ been received ☐ not been received  
☐ been filed in parent application, serial no. \_\_\_\_\_; filed on \_\_\_\_\_

13. ☐ Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.

14. ☐ Other

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**Part III     DETAILED ACTION**

*Specification*

1.    The following is a quotation of the first paragraph of 35 U.S.C. § 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification is objected to under 35 U.S.C. § 112, first paragraph, as failing to adequately teach how to make and/or use the invention, i.e., failing to provide an enabling disclosure.

As best understood, applicant teaches an automatic drilling control system for controlling the release of drilling string in response to any combinations of the drilling parameters including the bit weight, drilling fluid pressure, drilling torque and drilling string rpm. Applicant further teaches that the rate of drill string release increases with decreasing fluid pressure, bit weight and drilling torque or decreasing rpm, and vise versa. In this regard, applicant apparently fails to consider that during the drilling operation, the factors affecting the penetration rate are in fact interrelated, any change of one parameter will eventually affect the others while holding the

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rate of penetration constant by controlling the release of drill string. In this instant invention for instance, by increasing the rate of drill string release due to decreasing bit weight when first detected will immediately cause the increase in drilling torque and as a consequence, according to the invention, one would have to immediately decrease the rate of releasing the drill string which obviously would have created serious conflict to the previous operational command to the control system.

Similar contradiction would also occur between the rpm and the bit weight or between the drilling torque and the rpm and also between the pumping pressure and the remaining parameters as well. It is the examiner's view that at the least, applicant has failed to provide a logical explanation with respect to how such conflicts can be resolved. Because it is well known in the art that among other things, the relationship between the rate of penetration and the drilling parameters including the pumping pressure, the rpm, the bit weight, and the drilling torque are interrelated and interactive one can not simply isolate one parameter from the others (see Petroleum Engineering by Carl Gatlin, pp 114-131, included herein as a reference).

Specifically the operational procedures illustrated in page 35 line 32 through page 36, line 23 fails to teach for example how the drilling fluid affects the bit weight and how and when the secondary control overrides the primary control. Examiner

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also could not understand why among the four control parameters, the rpm and the torque regulators can be switched off, since as best understood, to achieve an optimal control of a drilling operation, all these four parameters need to be taken into consideration and should be properly balanced.

2. Claims 1-11 and 15-18 are rejected under 35 U.S.C. § 112, first paragraph, for the reasons set forth in the objection to the specification.

3. The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

4. Claims 1-11 are rejected under 35 U.S.C. § 103 as being unpatentable over Ball in view of Rogers and Gatlin publication. Ball discloses an automatic drilling control system which comprises an electronic drum brake control system in response to

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the bit weight variations (Fig. 3). Ball basically teaches the same principle of controlling the rate of drill string release as being recited in applicant's respective claims with the exception of the drilling fluid pressure sensor, the torque sensor and the rpm sensor. Inclusion of such sensors, in the examiner's opinion, is well within the scope of general engineering design considerations, in that it is well known to one of the ordinary skill in the art of drilling, the drilling fluid pressure, the drilling rpm and the drilling torque are among the important factor which affect the penetration rate and such has long been taught in the general publication such as Gatlin's Petroleum Engineering. To illustrate such inclusion, Rogers discloses a drilling optimization control system (Figs 1-3) which comprises a computer control system for optimizing the penetration rate. In which the drilling rpm and the thrust (or bit weight) are monitored and manipulated by the computer to achieve the optimal penetration conditions (Col. 4, lines 16+ ). It is therefore obvious to one of the ordinary skill in the art to have modified Ball's automatic drilling control system by including rpm sensor as been taught by Rogers and further including the pumping pressure and the drilling torque sensors into the control system so that more drilling parameters can be monitored and the penetration rate can be more effectively controlled as such has been clearly taught in Gatlin publication.

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*Allowable Subject Matter*

5. Claims 15-18 would be allowable if rewritten to overcome the rejection under 35 U.S.C. § 112 and to include all of the limitations of the base claim and any intervening claims.

*Conclusion*

6. Applicant's arguments filed on June 10, 1994 have been fully considered but they are not deemed to be persuasive in that, judging the schematic diagram shown in Fig 2 for the automatic drilling control system of the instant application, examiner could not see there exists<sup>s</sup> any overriding mechanism available which would allow one control unit to override the others. It is also the examiner's view that applicant fails to teach in reasonable technical details with respect to the principles regarding how the primary control and the secondary control are selected under a specific drilling environment, when such control system is to be implemented without undue experimentation to one of the ordinary skill in the art. Regarding the base of claim rejections based on the combination of Ball, Rogers and Gatlin; examiner believes that he has established sufficient grounds supporting a prima facie case of obviousness, specifically Ball and Rogers disclose the techniques of automatic drilling control based limited parameters while Gatlin teaches the importance of a

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more comprehensive drilling optimization approach which basically provides the theoretical background and the motivation of including a broader drilling factors into the automatic drilling system taught in Ball and Rogers.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Frank S. Tsay whose telephone number is (703) 308-2170.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-2168.

  
Tsay/FT

August 8, 1994

  
RAMON S. BRITTS  
SUPERVISORY PATENT EXAMINER  
ART UNIT 356